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FOR THE BENEFIT OF THE LESS DEVELOPED AREAS

Agenda Item : H

Netherlands

SIMPLE DEVICES FOR DEVELOPMENT PLANNING

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No. 01

H

SIMPLE DEVICES FOR DEVELOPMENT PLANNING

by

Dr. J. Tinbergen

Director of the Netherlands Economic Institute
Professor of Development Programming and Mathematical Economics at the Netherlands School of Economics

1. INTRODUCTORY

In this paper we propose to list a number of devices for the construction of a development plan. Together they are a complete set of activities to arrive at such a plan. They do not represent the most sophisticated methods known to the author but rather the most practical ones. Their selection necessarily remains somewhat arbitrary and depends on the author's taste. The resulting method of planning is one of successive approximations and not a simultaneous solution of the complete set of interrelated problems which a plan must solve. Each of the following sections may be considered a phase or a stage of the process. It is in the nature of successive approximations that some of the phases must be repeated if the assumptions used are disqualified by later findings. Some of the data to be used may themselves be the outcome of pieces of "partial research" which can be undertaken independently from the succession of phases.

As a rule, development plans will be based on the assumption that prices do not change. In some cases this may not be a permissible simplification; something will be said about it in section 6.

2. MACRO-ECONOMIC ESTIMATES

To begin with, estimates are made on the most desirable time path of total national product or income $\underline{y}_t$, total savings $\underline{s}_t$ and total investment $\underline{j}_t$. We assume that these figures are known for a base year $\underline{t} = 0$. The difference between j_t and s_t represents net foreign aid $\underline{f}_t$; we assume that it is known for the planning period. The essence of our problem consists of finding the optimum level of $\underline{s}_t$ or the optimum level of the savings ratio $\sigma_t = \frac{s_t}{y_t}$.

Both may vary over time. The optimum path must be such that at no moment is it desirable to save more or to save less. In order to judge this we must

(i) know its consequences and

(ii) have a yardstick to evaluate these consequences.

The consequences of increased savings are a larger volume of capital $\underline{K}_t$, resulting in a larger volume of production, both for all future. It is doubtful by how much future production will be raised if 1 per cent more of national income is saved in any given year. The simplest theory so far proposed is the one of the constant capital-output ratio. This theory

maintains that each addition to the capital stock leads to a proportional addition to national product. The proportionality factor is about 3 or 4 (if a time unit of a year is used) for most countries. For countries using considerable amounts of foreign capital the capital-output ratio may be considerably higher than otherwise would have been the case: the net product added to their national product will be lower than the product obtained from an investment by the amount of interest to be paid to foreign investors.

More refined theories are those using production functions. A wellknown example is the Cobb-Douglas function. It shows less than proportional increases in production; a 1 per cent increase in capital works out into a 1/4 per cent increase in production only. The wide divergence between these two figures may be interpreted as follows. In the theory mentioned first the tacid assumption is made that technical and organization progress as well as education develop in proportion to the rise in capital. If this assumption is kept in mind during the further elaboration of the plan, the use of constant capital-output ratios can be accepted. This means that education and technical progress etc. are planned in appropriate proportions.

A simple example may show the practical use of the assumptions just discussed. Let the capital-output ratio be 3 years and the savings and investment ratios in the base year 8 and 12 per cent of national income, implying foreign aid to the extent of 4 per cent. Let it be expected that foreign aid remains at this level. The rate of increase in income, according to our assumptions, will be 4 per cent ($\frac{12}{3}$) in the beginning. If the savings ratio were raised to 11 per cent, income would rise by 5 per cent annually; but in the first year consumption would have to fall by 3 per cent (11 minus 8). Similarly, more alternatives can be calculated, as indicated in the following table (expressed in per cent of national income):

Table 2.1.

Characteristics of Alternative Paths of Growth

Rate of savings	Annual rise in income	Initial fall in consumption
8	4	0
11	5	3
14	6	6

In order to make a choice the government must evaluate the consequences indicated above. It is the author's contention that at the moment economic science is not able to guide governments in this choice. Insufficient knowledge is available about the preferences of the population; moreover, the government as well as parliament may wish to deviate deliberately from these preferences if they consider the average citizen less farsighted than seems to be his own long-term interest.

We therefore assume that a choice is made by the government and that, as a consequence, the future development of investment, consumption and income is given.

Our example is oversimplified, in that it suggests a constant savings ratio and a constant rate of increase in income over time. The planning agency may make estimates with varying rates. In all probability the rate of increase in income will not be forthcoming immediately, since investments require time. If the gestation period is three years, the increases in income corresponding with higher savings in year 1 will only show up from year 4 on. This feature can be introduced fairly easily into our estimates.

3. SECTOR PLANNING

The next set of problems to be considered refers to the prospective development of demand in a number of sectors. First of all the sectors must be defined. Their number should not be too large; about twenty may be a good figure. The sectors should be as homogeneous as possible and it is clear that their choice depends on the structure of the country. Some sectors may be chosen because of their possible future importance. One sector may be non-competing imports. Once the sectors have been chosen, all data should be subdivided accordingly.

We start by estimating future demand for finished goods; these may be consumer, investment or export goods.

Consumer demand is estimated from the planned development of income and from expected population figures. Average income per head can be estimated and knowledge on Engel curves will enable us to estimate average demand per head for individual commodities or groups of them. By means of multiplication by population total demand for these groups of commodities can be obtained. A more refined approach consists of using the income distribution. In this case we must not only know the income distribution in the base year, but also the changes to be expected in it. One possibility is to assume that all income intervals will expand proportionately to average income. The method of estimating average demand for a given group of commodities can now be used for each income bracket. Thus a more precise estimate of total demand is possible. For commodities showing a non-linear Engel curve this estimate is better. For commodities with a linear Engel curve the previous method is just as good.

If no family budget statistics are available for the country concerned, figures for comparable countries may be used. Alongside income other factors will sometimes influence demand. In same cases trends may have to be added representing changes in tastes or technological improvements.

Demand for investment goods was estimated as one figure (for each year) in the macro-economic approach already. It can be subdivided into demand for, say, buildings, for equipment and for increases in stocks, if we have some initial figures and assume proportional increases. We will discuss a second (better) approximation below.

Export demand may be estimated with the aid of the principles used for estimating consumer demand. Incomes must now be incomes of countries absorbing exports. Since export commodities will not as a rule be finished consumer goods, the relationship between income and demand must be found from other sources than family budget figures.

Having estimated the demand for finished goods we can now estimate the necessary development of production of intermediate goods and raw materials, as far as specified by our sector definitions; they are supposed to be outputs of some sector. Their production is estimated with the aid of input-output coefficients. Demand for finished goods is considered the "final bill of goods" and the result of the operation will be the production programme needed, with the existing structure, to provide for this final bill of goods. It is not certain that the existing structure should be maintained. It may be desirable to develop more rapidly some industries showing comparative advantages; and to develop less rapidly some industries showing comparative disadvantages. For the time being it is assumed that the existing pattern was chosen in line with comparative advantages. In the project appraisal phase the pattern will be checked and a change may be suggested by it.

The sector-wise production programme just derived may now be used to estimate a second approximation of the investment programme, based on sectoral investment programmes. In order to carry this out we must know, for each sector, the capital-output ration and the gestation period characteristic for it. The desired increase in production in all sectors can then be translated into an investment programme. This will not, as a general rule, coincide with the one calculated before. In order for it to coincide the average capital output ratio and the average gestation period used in the first approximation would just have to be equal to the properly weighted averages of the sectoral capital output ratios and gestation periods. Proper weights are those corresponding with the relative increases in production of the various sectors.

Among the sectors considered we may also include some educational and other social activities. This enables us to integrate into the plan a plan for training the necessary manpower of all levels. The necessary inputs are buildings and further equipment as well as teachers, themselves an output of some educational institutions. One of the important characteristics of the educational sectors is the long duration of the process. It may well be therefore that education becomes a bottle-neck to the development process, unless imports of trained manpower are considered possible. The necessary imports can then be estimated.

As a rule the outcome of the sector estimates will constitute a check on the figures estimated in the macro phase. It will be necessary to repeat the calculations of both the macro and the sector phase whenever considerable discrepancies occur. This may be an inefficient procedure but it is my belief that it is not. In some simplified cases I think it can be proved that this "planning in stages" is an efficient approach[1]

Among the sectors a number will be producing "national goods", that is, goods which cannot be exported or imported. Important examples are energy, inland transportation, building, retail and wholesale trade, and a number of services. The production estimates obtained for these sectors can be considered final. Whatever changes in structure will be considered later must be changes in "international sectors", producing goods which can be imported or exported. Such switches are not possible in national sectors.

There may even be scope in introducing the concept of "regional sectors", producing goods which cannot be imported into or exported from the regions where they are needed. As soon as a plan has to be specified for regions -- meant here to be parts of a nation -- this concept becomes relevant. It depends on the aims of economic development policies what use can be made of the concept. If these aims imply the fixation, beforehand, of income aims for the various regions, the necessary production of regional goods can be estimated directly, before even the distribution of interregional sectors over the regions is fixed. It is true that this is an approximation only; strictly speaking the need for regional products may depend on the industry mix of the region. As a first approximation, however, this need may be assumed to depend on total income (or production) only.

4. PROJECT APPRAISAL

The heart of development programming consists of the appraisal of individual projects and to select those to be included in the programme or plan. The bulk of the work involved is of a technological character: the preparation of figures describing the inputs and outputs of each project, both during

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1) J. Tinbergen, "Planning in Stages", Statsøkonomisk Tidsskrift, (1962) p.1.

the investment period an during the operation period. In principle these figures must describe all the "relevant" features, that is the contributions made to the aims of development policy and the use made of the country's scarce resources. Since the main aims usually are economic ones the economic aspects of the projects usually rank high; but several extra-economic aspects are also important, such as the project's contribution to employment, to income distribution among groups of the population and among regions, to education, to health and to the cultural level of the country. Some of these aspects cannot be measured or estimated and may be judged intuitively only. The methods of appraisal to be used have been developed mostly by economists, but their applicability is much more general and it is an error to think that they are imposing economic criteria on extra-economic aspects. They are the only logical way of solving a problem of choice, wherever it comes up. Of course they may be subject to improvement. A prerequisite of making a development plan is the existence of a sufficient stock of projects, in the public as well as in the private sector, sufficiently detailed to be carried out when necessary. The preparation of such a stock is an integral part of the total task of planning.

The first question to be dealt with is the one of the most appropriate "unit" or "building block" to be used in the exercise. Although we suggested, in what preceded, that it is the single project in the practical sense of that word, we think it is better to consider as the unit of appraisal something more complex, expressing the necessary complementarities involved. Our building blocks of the programme to be selected consist, each of them, of one project in an international sector plus a set of complementary investments in the national sectors. An example will clarify matters.

Let the project in an international sector be a weaving factory. For its operation this factory will need energy transportation, building, and some services which must be available and which cannot be imported. Productive capacity in these national sectors must be expanded simultaneously with the creation of the weaving unit. We will call these additions to capacity the complementary set of investments in national sectors. Its estimation will be discussed below. Before doing so we must emphasize that the complementarity just discussed does not exist with regard to any inputs from international sectors needed: these inputs can always be imported. It is not true, for example, that the establishment of a weaving unit also requires the establishment of a spinning factory: the necessary yarn may be imported. The possible international-sector investments should therefore all be considered separately in order to find out which of them shows comparative advantages and which does not show them. But each of them should be combined with the complementary set of investments in national sectors.

The next question is the criterion to be used. Many criteria have been proposed by the many writers on the subject. Practically all of them can be brought under the general formula of a fraction. The numerator of this fraction expresses the value of the contributions to the aims of national development policy. The denominator expresses the value of the scarce factors used. It is customary to include in the denominator only the value of the factors used during the investment period and not those during the operation period. The latter will then be brought in as negative contributions in the numerator. It would be possible to put them into the denominator. We will stick to the customary method here. The simplest case conceivable shows only one term in both the numerator and the denominator, for instance the contribution to national income in the former and the capital invested in the latter. This is correct if the only aim of development policy is raising the national income and the only scarce factor is capital. If there is another aim, for instance, to increase employment, the numerator should be the "value" sum of the two aims. This presupposes

that we can attribute relative prices to the aims. Thes prices may be obtained from interviews with policy-makers. In principle they can also be considered as marginal (social) utilities of the aim variables. From the economist's point of view they are autonomous or exogenous; this illustrates the acceptance, by the economist, of extra-economic elements in policy aims.

If there are more than one scarce factor, a similar problem turns up. Alongside capital, such factors as foreign exchange or trained labour may also be scarce. Their total value in the denominator can only be calculated if we have prices. These prices cannot be considered autonomous, however, They must be so as to equilibrate demand and supply. If the markets considered are in equilibrium the observed prices (market prices) may be used. If the markets are not in equilibrium, fictitious prices must be used, known as accounting prices or shadow prices. Under some circumstances these prices can be estimated fairly accurately. The price of an imported input which is protected by an import duty should be taken equal to the world market price. If all the investment projects and the factors needed for them are known, the shadow prices can be found by trail and error methods aiming at

(a) using all of the available scarce factors, and
(b) maximizing the contribution to the aims [2].

In other cases crude estimates of shadow prices can only be made. There are strong arguments to apply a low shadow price for unskilled labour.

Shadow prices for factors may also have to be used in the estimation of the contribution to national income of a project. If among the aims balance of payments equilibrium is chosen, the price to be used for a given improvement in the balance of payments may be taken equal to the shadow price for foreign exchange. Here the price would, then, not be autonomous -- unless this aim were considered to have an extra-economic value apart from its economic significance.

Both the contributions to the aims and the scarce factors used should be estimated for a future period, in principle the period of the project's life time. This implies that the quantities and the prices used need not be equal to those prevailing at the moment of appraisal. The quantities of inputs may diminish as a consequence of a learning process. The prices may change as a consequence of changed scarcity conditions.

On the list of projects to choose from we may not only have alternative projects, but also alternative versions of what is essentially the same project. These alternative versions may differ in the technologies used either for the operation phase or for the investment phase. The different techniques may be characterized by their capital intensities, that is, quantities of capital used per man employed. In some production processes considerable ranges of variation for capital intensity exist and a proper choice may be important especially if heavy weight is given to employment as an objective. The choice just indicated may sometimes be made as a separate "partial" study, if it is likely to depend only slightly on the precise outcome of the appraisal of other projects.

The use to be made of the criterion described is to select the projects yielding the highest values of it, except for some forms of regional policy to be discussed in the next section. This raises the question where

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2) The problems to be solved are related to but not identical with linear programming problems. For applications of linear programming to this field see H.B. Chenery and P.G. Clark, Interindustry Economics, New York 1959, especially p. 123 f.f. and p. 283 f.f.

to stop. As a rule the volume of investment will be the figure determining the frontier between projects included in the programme and projects not included. A problem arises, however, when the marginal project chosen in this way makes a negative contribution to the aims. A simple example is presented by the case in which a negative contribution to national income would be made. Such a situation indicates that there is something wrong with the general economic situation of the country considered; in a general way it indicates that incomes paid are higher than "the country can afford". Such a conclusion can only be drawn after a sufficiently large number of projects has been traced and appraised. The conclusion is of considerable importance to the development policy of the country.

5. REGIONAL PROGRAMMES

Sometimes not only a programme for the country at large is required, but also programmes for the geographical subdivisions of the country, to be named "regions". This introduces a new dimension into the problems, that of distance and location. In its full consequences this new dimension will make the problems so much more complicated that we cannot hope to solve them in a precise way. The necessary data as well as the necessary theories are lacking. In this essay only the simplest devices will be discussed which must be introduced in order to arrive at regional programmes consistent with regard to some main criteria. Similarly to what is needed for a national plan, we must also now know the aims of the regional development policy. Usually, if we speak of a regional policy, some extra-economic aims will be on the minds of the policy-makers. Well-known examples of such aims are the reduction in the differences in income per head or unemployment between the regions. This implies that more investments will have to be made in regions showing low incomes or high unemployment, even if the most attractive projects from the national point of view are not to be found in those regions. The simplest way in which we can now proceed is the following. We make a distinction between "shiftable" and "non-shiftable" projects. The former can be carried out in several if not all, regions, without changing their contribution to national aims. The latter can only be carried out in one region (or a few regions). Each project in an international industry (with the complementary sets of investments in national industries) must now be given a set of "numbers" indicating the regions in which this project or parts of it can be carried out. The selection of projects for inclusion in the development programme will now be different from what it was in section 4. Instead of taking first what from a national point of view was the "best" project, then the second best, and so on, we select now from the projects carrying the number of the region most in need of development only. The first project to be picked now will be the best among those carrying the number of the particular region. The second project will be the second best again among the projects carrying that same number, and so on. When, as a consequence of the projects selected, the region considered has been brought to the level of the next poorest region picking will be from projects situated in both regions. When both have been lifted to the level of the next poorest (third) region, we go on taking in projects of the three regions -- in proportions keeping them at the same level. In this way we go on until we have fully used the investible funds available. It will be understood that a large number of variations are conceivable with regard to the criteria used for the needs of the regions, and the degree to which these needs have to be taken into account.

The project selection described in the preceding and the present section must be considered as a correction of the sector estimates discussed in section 3. Sectors showing comparative advantages in production cost in the sense of the theory of international trade will appear to have been expanded

more than sectors showing comparative disadvantages. Some of the calculations based on the sector approach, as, for instance, the needs for education, will have to be revised accordingly. The same applies to the refined calculation of investments, including their timing. This again illustrates the trial-and-error character of our method. Strictly speaking, trial and error methods are only correct when they lead to a converging series of estimates This is not necessarily always true. Additional theoretical research will be needed to show the character of the series of estimates. Sometimes a choice exists between different methods of adaptation some of which are rapidly converging[3]. These may be useful if the total amount of work has to be kept within reasonable limits, but they are not always the best methods from the economy's point of view.

6. ASSUMPTION ABOUT PRICES

It was already observed in section 1 that prices are as a rule supposed to remain constant. It may be said to be the very aim of planning to maintain equilibrium and hence to avoid the necessity of changing prices. There are cases where this assumption is not permitted. Plans may then have to be based on changes in prices. This applies, first of all, to external changes, that is, changes in world market prices as a consequence of external developments. These must be estimated as accurately as possible from pure forecasts, as distinct from plans. Changes in prices may also be necessary as a consequence of some features of the plan. This may be so if exports are increased of a product in which the country has comparative advantages and serves a considerable portion of the world market. The price change must then be functionally related to the rise in exports with the aid of a world demand function. As a consequence of these price changes national income will also be affected and all demand functions depending on it. It is not too difficult to introduce such changes into the formulae of our procedures[4].

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3) Cf. Herbert S. Levine, "The Centralized Planning of Supply in Soviet Industry", Joint Economic Committee, Congress of the United States, Comparisons of the United States and Soviet Economics, Part I, Washington, 1959.

4) Cf. H.C. Bos and J. Tinbergen, Mathematical Models of Economic Growth, chapter 6, New York, 1962.

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C O R R I G E N D U M

For "Agenda Item H", read "Agenda Item H.1.1"

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SUMMARY

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By Dr. Jan TINBERGEN,
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Professor of Development Programming and Mathematical Economics at the Netherlands School of Economics

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No. 01

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SIMPLE DEVICES FOR DEVELOPMENT PLANNING

by Jan Tinbergen, Professor in Development Planning and Mathematical Economics at the Netherlands School of Economics.

1. Introductory.

This paper lists a number of devices for the construction of a development plan. Together they are a complete set of activities to arrive at such a plan. They do not represent the most sophisticated methods known to the author but rather the most practical ones. The resulting method of planning is one of successive approximations. Each of the following sections may be considered a phase or a stage of the process.

2. Macro-economic Estimates.

To begin with, estimates are made on the most desirable time path of total national product or income, total savings and total investment. The essence of this problem is to find the optimum savings ratio. The consequences of a given savings level can be estimated using a constant capital-output ratio or production functions. Economic science is not able to guide governments in the evaluation of alternative time patterns of the development of income and consumption.

3. Sector Planning.

The next set of problems refers to the prospective development of demand in a number of sectors. Consumer demand is estimated from the planned development of income and from expected population figures. Demand for investment goods can be subdivided into demand for, say, buildings, for equipment and for increases in stocks, if we have some initial figures and assume proportional increases. Export demand may be estimated with the aid of the principles used for estimating consumer demand.

Having estimated the demand for finished goods we can now estimate the necessary development of production of intermediate goods and raw materials with the aid of input-output coefficients.

A second approximation of the investment programme can be made using capital-output ratios, gestation periods and the desired increases in production in all sectors.

Among the sectors considered we may also include some educational and other social activities. Some sectors will be producing "national goods", i.e., goods which cannot be exported or imported. Changes in structure concern changes

in "international sectors", producing goods which can be imported or exported.

4. Project Appraisal.

The appraisal of investment projects involves the preparation of figures describing the inputs and outputs of each project, both during the investment period and during the operation period. Those figures must describe all "relevant features", i.e. the contributions made to the aims of development policy and the use made of the country's scarce resources. The units of the investment programme to be selected are suggested to consist, each of them, of one project in an international sector plus a set of complementary investments in the national sectors. If the markets are not in equilibrium, accounting or shadows prices have to be used to evaluate scarce factors and products.

5. Regional Programmes.

The aims of the regional development policy have to be known. A distinction is made between "shiftable" and "non-shiftable" projects. The former can be carried out in several, if not all regions, without changing their contribution to national aims. The latter can only be carried out in one region (or a few regions). The projects have to be selected according to the needs of the regions.

6. Assumption about Prices.

Prices are as a rule supposed to remain constant. In some cases this assumption is not permitted. A distinction has to be made between external price changes and changes in prices which are necessary as a consequence of some features of the plan.

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Agenda Item : H.1

Greece

OVERALL ECONOMIC PROGRAMMING AND REGIONAL DEVELOPMENT IN GREECE

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INTRODUCTION

1. This paper is a short account of research into [1] and experience in the application of national and regional planning in Greece since 1959. [2]

2. It refers to a country which is neither underdeveloped nor completely developed, which introduced economic planning very rapidly while retaining a very large private sector in the economy and relatively very liberal foreign transactions and whose labour supply may be highly variable given its abundant outlets to other European economies.

3. Any wider significance which this account may have for other countries should therefore be regarded in the light of those circumstances.

THE NECESSARY CONDITIONS

4. Economic planning has to satisfy first of all two essential conditions: efficiency and consistency in the allocation of national resources. Furthermore, in economies with a substantial private sector, it must provide effective tools for the implementation of the objectives of the private sector. Planning for the public sector alone will fail to satisfy the condition of efficiency, while failure to provide for implementation of plans for the private sector will fail to satisfy the condition of consistency.

5. When an economy adopts economic planning almost overnight, a number of additional conditions must be satisfied,

6. The first is speed. Economic programming is a complicated and increasingly sophisticated process. It requires an infrastructure of statistical information whose proper processing takes a long time. The staffing and integration of a planning team is also a rather long highly selective process. Governments can seldom wait that long before taking major development decisions. If planning is to make an effective contribution to the economic affairs of the country, it must proceed by stages of progressive refinement. A simple, workable planning framework for macroscopic decisions has to be created within the first six-to-nine months. As the results of more detailed work become available, the initial framework can be improved and strengthened. This in turn creates the need for the plan to have a revolving character. Whatever the planning period adopted, constant improvement in the planning mechanism should lead to an annual revision of the whole plan period, incorporating the remaining years and adding as many as have elapsed so that policymakers can always have sufficient perspective in front of them.

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1 This research was carried out at the Athens Technological Institute between 1959-61 with grants from Doxiadis Associates and the Ford Foundation.

2 Ministry of Coordination, the Five-Year Development Program for Greece, Athens, 1960.

THE NATIONAL FRAMEWORK

7. Planning usually starts from the exogenously determined variables and fixes the other variables in the system so as to optimize the use of the former. Most developing countries use either the supply of external finance or their labour supply as their fixed variables. Neither of these could work in Greece since surplus labour has an outlet in Western Europe and foreign finance is obtained mostly from private sources, rather than international organizations, which fix the annual inflow both in terms of needs and the structure of the country's foreign transactions.

8. Domestic investment resources became thus the foundation of the plan framework.

9. Using the ten-year period 1950-59 basic hypotheses as to saving propensity and the marginal productivity of investment were adopted. The marginal propensity to import then served for projecting foreign payments and the permissible margins of foreign finance. These overall projections were then tested by demand analyses in each sector and through successive adjustments a revised set of projections were obtained (Figure No.I).

10. To obtain an essential degree of consistency in intersectoral allocations, sectors were classified in a sequence showing the relative dependence of one from the other. Accepted as leading sectors were those which supplied final demands or generated foreign currency for the same purpose. Project priorities were set by the marginal productivity of each project[3]. Then came producer services whose requirements varied in some relation to the growth of leading sectors. Finally, expenditures on social overhead were set so that they grew at a rate slightly less than the growth of the leading sectors, but considerably above population increase so that both monetary equilibrium and a rising per capita standard were obtained (Figure No. II). Allocations among sectors within the social overhead group were made on the basis of relative deficiency.

PRINCIPLES AND ORGANIZATION OF REGIONAL PLANNING

11. Regional Development and Planning can be conceived either as covering uniformly all the subregions of an economy or as focussing on one or few subregions.

12. Greek Development Planning was from the start based on the principles of equalizing investment returns at the margin, rather than equalizing incomes per region. Regional Planning therefore did not serve as a means of attracting to a given region more resources than opportunity cost would justify.

13. In such circumstances the organization and function of planning at the regional level is a reduced replica of the national plan serving the purpose of decentralization and coordination. If the existence of development regions with separate identity is conceded, efficiency and consistency in project priorities is

3 H.B. Chenery, The Application of Investment Criteria, Quarterly Journal of Economics, February, 1953.

obtained, when project proposals reach the National Plan, not through independent specialized field services, but as coordinated plans through planning agencies.

14. The functions involved in the planning process are: survey, programming, execution. The authorities involved are the Central Plan, the Regional Plans, the specialized Ministries, their field offices, and finally the townships. The projects are classified as national, whose importance transcends the boundaries of a single region, regional and local, significant only within a township. The distribution of functions among authorities for different projects is shown in an oversimplified manner in Figure No. III.

15. The potential of each region may be defined as the product of its hitherto unexploited natural resources on one hand and the influence which its current level of socio-economic development has for the future on the other. In the definition of regions the sequence of criteria used was as follows:

16. The physical criterion. The mountainous and insular character of the country helped a first stage division into agricultural valleys whose identity was more or less given by physical environment. The valleys were then grouped into larger rural regions defined by the relative homogeneity of their soil potential and facility of physical access. Non agricultural resources (minerals, fuels, water) were included in these major agricultural regions thus giving a first subdivision of areas of current and potential primary production.

17. The ekistic criterion[4]. Economic activity is increasingly of a secondary and tertiary nature carried on in ever larger settlements. Hence the pattern of settlements in each primary area was analysed in terms of their role as market, processing and transhipment centers for primary activity and region boundaries, adjusted accordingly.

18. The administrative criterion. The largest administrative subdivision being very small (an average of 2,500 sq.kms.) to satisfy criteria of economic uniformity or viability, regions were finally adjusted to coincide with the perimeter of five-to-ten such subdivisions.

TOOLS FOR PLAN IMPLEMENTATION

19. In an economy with a large private sector and liberal external transactions the problem of plan implementation is important but if tackled properly not as complex as at first sounds.

20. The sectors of power, transport routes, communications, education, health and social security covering over a third of total investments are under direct Government control.

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4 From the Greek root "OIKOS" meaning home, settlement.

21. Agriculture relies for both short and long-term financing on a Government owned Agricultural Bank which can thus influence development there

22. Intensive planning in the sector of tourism has shown that private enterprise in a developing country, lacking the resources to do its own planning and research, will easily respond to carefully prepared public plans accompanied by proper incentives of which finance is not always the most important. This same experience can be applied to the sector of manufacturing. Locating sound investment possibilities is a greater handicap to private enterprise in developing countries than lack of finance and in turn a powerful tool in the hands of planners if they can perform this task. This however is a big "if". Planning of the manufacturing sector to a degree acceptable to private enterpreneurs is a long, difficult and expensive task. But there seems to be no alternative to a consistent implementation of the overall plans. Finally, private housing is easily amenable to fiscal controls. It is needless to mention here the customary credit, fiscal and other traditional tools by which Government can control the performance of the economy.

23. A word of caution is necessary here. These comments show the technical possibilities that exist. The adoption of these measures in the proper manner and time is a political process which does not always coincide with the planner's aspirations.

Figure I. A Schematic Approach to Greek Development Programming

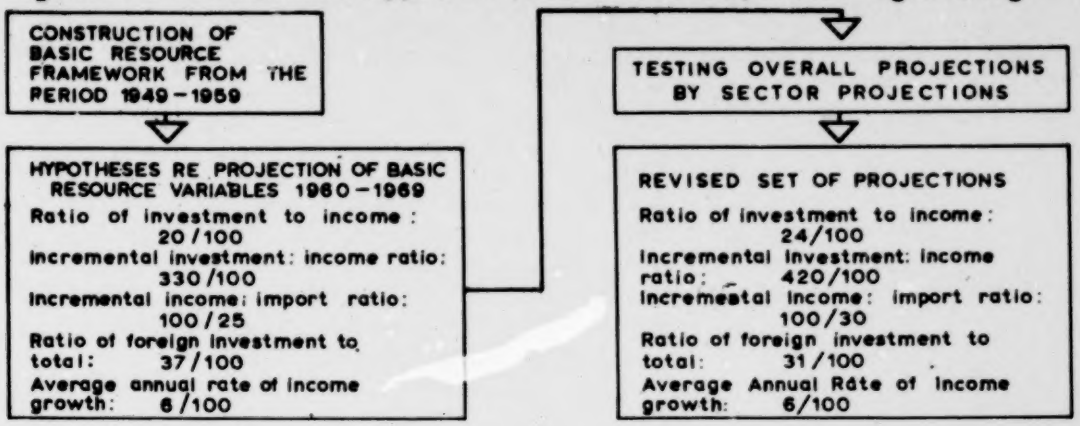
CONSTRUCTION OF BASIC RESOURCE FRAMEWORK FROM THE PERIOD 1949-1959
HYPOTHESES RE PROJECTION OF BASIC RESOURCE VARIABLES 1960-1969
Ratio of investment to income: 20/100
Incremental investment: income ratio: 330/100
Incremental income: import ratio: 100/25
Ratio of foreign investment to total: 37/100
Average annual rate of income growth: 6/100
TESTING OVERALL PROJECTIONS BY SECTOR PROJECTIONS
REVISED SET OF PROJECTIONS
Ratio of investment to income: 24/100
Incremental investment: income ratio: 420/100
Incremeatal income: import ratio: 100/30
Ratio of foreign investment to total: 31/100
Average Annual Rate of income growth: 6/100

Figure II. Sector Classification for Purposes of Determining Inter-dependence & Resource Allocation.

LEADING SECTORS	PRODUCER SERVICES	SOCIAL OVERHEAD
AGRICULTURE GENERALLY		
MANUF AND MINING		
TOURISM		
SHIPPING	SHIPPING	
	OTHER TRANSPORT	
	POWER	
	TELECOMMUNICATIONS	
	EDUCATION	EDUCATION
	HOUSING	HOUSING
		HEALTH
		SOSIAL SECURITY

Figure III. Distribution of Functions in National & Regional Development.

TYPE OF RROJECT	AGENCIES RESPONSIBLE		
NATIONAL PROJECTS	MINISTRIES	CENTRAL PLAN	MINISTRIES
REGIONAL PROJECTS	MINISTRY FIELD POSTS	REGIONAL PLAN	MINISTRY FIELD POSTS
LOCAL PROJECTS	TOWNSHIPS	REGIONAL PLAN	TOWNSHIPS
	SURVEY	PROGRAMMING	EXECUTION
	DEVELOPMENT FUNCTIONS		

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SUMMARY

Agenda Item:H.1. Greece

OVERALL ECONOMIC PROGRAMMING AND REGIONAL DEVELOPMENT IN GREECE

By John C. PIPEROGLOU,
Head, Economic Branch,
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Lecturer in Economics,
Athens Technological Institute

Papers have been contributed to the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas as working papers for that Conference. They are published as presented by the contributors, and the contents and the views expressed are those of the contributors. (See notes overleaf.)

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OVERALL ECONOMIC PROGRAMMING AND REGIONAL DEVELOPMENT IN GREECE

by John C. Piperoglou

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Consulting Engineers, Athens
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SUMMARY

1. This paper refers to problems which a country has to solve when economic planning must be introduced very rapidly, while the economy retains a large private sector, its foreign transactions are quite liberal and neither external finance nor the labour supply are in any way predetermined. In the case in point a fairly simple macroscopic framework was adopted based on income-saving propensities with the other variables determined by a maximization of the social productivity of investments.

2. A first approach to consistency was obtained by making expenditure on producer services determined by the requirements of sectors of final demand, while allocations to social overhead were determined by the capacity of the economy to supply the consumer demand generated by such expenditure.

3. The plan was put on a revolving basis to secure gradual refinement.

4. Within this framework the function of regional planning is to decentralize and coordinate projects at the regional level rather than secure equalization of regional incomes.

5. Regions are determined by physical, ekistic and administrative criteria.

6. The principal tool of attaining the objectives of private sectors is intensive planning with financial and other incentives playing an auxiliary role.

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Agenda Item:H.2

United Kingdom

ORGANISATION OF STATISTICAL SERVICES

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ORGANISATION OF STATISTICAL SERVICES

by W. F. Searle, Chief Statistician,
Department of Technical Co-operation,
United Kingdom.

During the last fifteen years many countries have developed to the point of being able to justify a Department of Statistics. The need for this change and the ability to pay for it out of increasing government revenues in the post-war years was self-evident in the larger countries although the size and scope of the Department was, of course, a matter on which there was considerable variation of opinion. Equally obvious was the inability of a number of very small administrations to justify a specialised statistical service. Between these two extremes were a number of countries or territories of small to medium size (whether judged by population or government revenue or by a more complicated indicator) for which the judging of the correct timing of a change to a statistical service organised as such was by no means an easy task. A keen person in a key position wanting the service could easily tip the balance in favour of a decision that the time had come to start to organise one; it was also quite possible for a dominant personality elsewhere to argue that the money would be better spent on expanding education or health services or on another new specialised service regarded as of higher priority.

2. Occasionally a first step forward could be taken by setting up a Statistical Bureau, as distinct from a Department of Statistics, leaving the statistical work done in the other departments with them although co-ordinated by the Bureau. At the same time, the Bureau undertook general functions like the preparation of capital formation, balance of payments and national income estimates. When it was impossible to justify a full Department of Statistics from the beginning, this compromise had considerable advantages.

3. Little can be said about statistical work in the very small countries. Visiting experts can undertake ad hoc studies and overseas trade statistics, for example, can be produced in a Customs Department. This is usually done in a section staffed by clerical officers having a loose link with the Director of the Department who sometimes takes almost no interest in their work. One keen man, often undergraded, may produce good quality work even in these circumstances but these favourable conditions do not last for long because of promotions and other staff changes.

4. At the other extreme, some of the problems discussed in the following paragraphs are scarcely applicable to the very large countries.

Moreover the special problems arising in these conditions have not been considered since they are largely outside my own experience.

5. A full discussion of "the principal problems relating to the organisation and operation of a national statistical service" took place at the International Seminar on Statistical Organisation sponsored by the United Nations with the co-operation of the Government of Canada and held in Ottawa in 1952. The report of this seminar (U.N. Statistical Papers, series M, No.16, referred to subsequently as M.16) is still a live document since it deals with problems that are not easy to solve and tend to recur in somewhat different forms when an apparent solution has been found. There were many representatives of the less developed countries at the Seminar but the report does not place a special emphasis on their experience. As countries move forward, however, most of the problems discussed in 1952 have an increasing relevance.

6. The conclusions (pages 4 and 5 of M.16) contain a good definition of the functions of a national statistical system which can be summarised as:

(a) to collect, process and publish regularly, with adequate appraisal and annotation, a set of integrated statistics necessary for an understanding of the economic and social structure of a nation;

(b) the development and application of statistical standards for the collection, processing and publication of statistics;

(c) to conduct research in statistical methods and operations; and

(d) to facilitate the education and training of statistical personnel of all grades.

7. Other sections of the conclusions in the Seminar report dealing with "statistical organisation" and the "nature and scope of national statistical programmes" are inevitably worded in general terms and they stress that much depends on the circumstances (needs, political structure, traditions and resources) of each country. The great value of the report, of course, is to be found in the abstracts of the papers and the record of the discussions. Throughout the remainder of this paper the uniqueness of the situation in each country will also never be far from the surface.

8. Since the countries we are considering are all endeavouring to develop at a rapid pace requirements are related to their need "for an understanding of the economic and social structure" which is very great indeed. Without it, they are not able to provide the basic information that is a pre-requisite of obtaining external financial aid. At a later stage, a lack of full understanding brings many uncertainties into development planning and handicaps judgments on the rate of growth at which to aim.

9. This situation is reflected in the place that is given to statistical services in the machinery of government, a common arrangement at the

present time being for a Statistics Department to be part of the Ministry that is concerned with economic development and for it to be linked closely with the organisation that has responsibility for development planning. It is important to find the best way of applying the principle that priorities for statistical work should be settled in relation to the needs of the country as a whole and not distorted because the service has a link with a Ministry with a partial sphere of interest. It is rarely possible, of course, to find a way that is beyond criticism and a close link with development planning may mean that social statistics (those dealing with health, for example) are not given sufficient priority when a Statistics Department is part of a "Ministry of Economic Development". I also sometimes wonder whether enough attention is given in these circumstances to some work at least on the trends shown by the indicators used to throw light on levels of living.

10. A Statistics Department has a special role to play in the relationship between Ministers and Civil Servants in the course of which policies are framed as a balance between short-run and long-run considerations. The chances of finding the right solution are enhanced enormously if there is a flow of information on the state of a country's economy and if the achievements of policies decided in the past can be shown in a clear and unambiguous way. The likely direct effect of proposed measures, their indirect advantages and disadvantages and the number of people affected by them can all be demonstrated most effectively by statistical analyses if adequate data is available. Analyses of this kind have a great effect on the quality of the policy discussions. May I add here that I have always seen something essentially democratic about Yearbooks and Digests of Statistics. Basic facts about the economic and social systems are made available to all who want them with an implied promise that they will be produced regularly whether or not they show favourable trends. The statistics can be explained and justified in other places but in the main statistical publications they are issued in a neutral fashion.

11. The usual situation is that a Director of Statistics lives in a world of scarce resources in relation to the programme of work he would like to adopt after taking full account of the priorities that have been settled. He is thus faced with a never ending task of making the best use of the limited means at his disposal. Economical planning is many sided and one of great importance is the setting of the appropriate standards mentioned in paragraph 6 (b). The Director and his senior staff need to be in touch with current views on methods and techniques and, in most circumstances, they have to adopt or develop those that are simple and direct, e.g. no "fancy" index numbers or attempts at elaborate input-output studies. In this sphere nothing is more important than a sound knowledge of sampling theory and skill in solving the practical problems that arise whenever sampling is used.

12. It is never easy for a man who does not know a country well and is not closely in touch with civil service traditions to start a statistical service. Once a department has been established, however, it is a great advantage that a shortage of qualified Statisticians, a lack of certain specialised statistical skills or weakness on some organisational questions can be off-set by bringing in experts under one of the many forms of technical assistance that are available to

the less developed countries. Technical assistance frequently gives an opportunity of undertaking new projects (e.g., the first industrial production census) that can be absorbed into the normal programme of the work of the department when they have passed through the difficult initial stages that absorb so much of the time of senior and professionally trained staff. Special training programmes - again available through various technical assistance schemes - are also a fundamental aspect of making the most of limited staff. In particular the time of Statisticians can be made much more effective if middle-grade staff can be given adequate training.

13. A Department of Statistics can be a large organisation but the spearhead is a relatively small number of senior and professionally qualified staff. It is not easy to define Statisticians and, in practice, many of them have come into their work as either "applied" mathematicians or "applied" economists. The number who are both, or are econometricians or whose university education has covered all the special features of a Statistician's outlook and skill is not great. This is moving towards a subject on which there could be considerable controversy and I note that it was avoided at the Seminar in 1952. My own solution is to direct attention away from the question of all-roundness in the outlook and skill of individual Statisticians and to stress the need for a well-balanced department. Something similar to this view must have been expressed at the Seminar because one of the summaries of the discussions (M.16, page 122) contains a statement that "a statistical agency requires personnel with various attributes". For some aspects of the work of the department "applied" economists are admirable; for others, "applied" mathematicians are essential; and for some work nothing is better than the two types teamed up together. Furthermore, the economist types should be encouraged to improve their initial limited knowledge of the theory of statistics by departmental discussions, by working through the standard text-books and, if possible, by attending training courses or university seminars. Equally, the mathematical types (possibly through national income studies) should be encouraged in the same way to know what goes into the training of an economist, and they too, should have the advantage of special training courses or seminars, if suitable ones can be found. After Statisticians have been in the Department for a few years, the various approaches to statistical work should begin to be less distinctive and at the administrative level in the department, if the top posts are filled by the promotion of long serving officers, should cease to be relevant.

14. A fundamental question is "how centralised should a statistical organisation be?" If there are three or five or even seven qualified Statisticians in a country, there is everything to be said for their working together as a single team in a Statistics Department. This follows from the principle in paragraph (9) i.e., that priorities for statistical work should be settled by taking account of the country's needs as a whole. A whole unit of Statistician's time allocated to a particular Ministry or Department when the total number of Statisticians in a country is small is most unlikely to express true priorities. In practice, of course, certain Departments press hard for their statistical work to be handled by a qualified Statistician and any allocation of whole units reflects the relative keenness of Departmental Heads rather than a proper assessment of priorities. A further reason for a central organisation for a small team of qualified Statisticians follows from paragraph (13). The team as a whole may be well balanced but individual members of it may not all have the qualities that are needed for all aspects of statistical work in a limited field of application. Centralisation is thus essential in the early years (and much longer in a small country) but when the number of

Statisticians has expanded and priorities can be expressed reasonably well by the allocation of whole units there may well be much to be said for the organisation of statistical units in the larger Ministries or Departments such as those handling Agriculture, Labour or Education. The Statisticians will be far closer to their colleagues and they should be able to give more help in policy discussions if they are part of Ministerial or Departmental teams. In a paper prepared by an official of the U.N. Statistical Office for the 1952 Seminar (M.16, pages 12-14) it was recorded that "Statistical systems with a major operating office and with central control or co-ordination" of other national statistical units are "perhaps the type ..... most common amongst the sytems existing at present in the countries of the world". In these circumstances, however, arrangements are necessary so that Statisticians who are working away from the centre can be moved from time to time from one post to another and kept in line for promotion to the higher posts which are likely to be found only at the centre. There are also dangers in any Civil Service of "the break-up of Statisticians into isolated groupings" (summary of discussions, M.16, page 43). How these arrangements are to be made or the dangers avoided must depend largely on the way the Civil Service in any country is organised.

15. Out of the many problems, within my experience, facing a Director of Statistics in a less developed country I have selected four which I am describing in the following sub-paragraphs.

(a) So much of the information that is needed for policy purposes in the circumstances we are considering is best gathered or can be gathered only by sample surveys, usually with households as the sampling unit. An ad hoc survey requires the use of a considerable quantity of high level time in a Statistics Department and a large amount of effort has to be expended on finding suitable supervisors and enumerators for the period of the survey. The costs per "unit of survey information" fall if a survey organisation can be kept continuously in existence even if it has to be expanded by temporary labour for certain larger surveys. Moreover, the quality of the information collected improves considerably if supervisors and enumerators gain experience through a run of surveys. On the other hand, it is far easier to obtain a budgetary allocation for ad hoc surveys with a specific purpose, e.g. a household expenditure survey designed primarily for a revised retail price index. Even when funds have been obtained for a survey team to remain continuously in existence they are at risk for some time; a Treasury official may well be able to make play of the fact that the collection of data may have run ahead of the ability of the central unit to digest and use it or that, with some gaps in the programme of agreed surveys, the Statistics Department has used its team occasionally for low priority or experimental work. Moreover, Treasury officials may be shocked by a decision that it would be better not to use the team for the collection of data on agricultural production if experienced Agricultural Department staff can be found to undertake the field work. Obtaining and maintaining a continuous survey team is one of the critical stages in the development of statistical services in larger countries.

(b) There are great advantages in a Statistics Department controlling large-scale operations like a population census but there is a danger that other work will be swamped and essential developments in other fields deferred. The situation may be eased, especially at the processing stages, by obtaining outside help in the form of technical assistance. Largeness, however, in the case of a population census, arises from the amount of detail to be collected and the skills involved are mainly administrative once the scope of the census has been settled and the analysis planned. Hence the spearhead of a relatively small

Statistics Department can be enlarged for a temporary period by non-Statisticians, essentially organisers who know the country well and can make full use of their experience of local administration. Good men of this type are scarce but frequently not as scarce as qualified Statisticians.

(c) When capital formation or balance of payments estimates or a full set of simplified national accounts are first prepared they contain an uncomfortably large number of decidedly shaky items for which adequate information is not available. The natural tendency of all Statisticians in these circumstances is to give estimates of this kind a very restricted circulation. Future troubles are seen only too clearly e.g. a probable over-estimate of the gross domestic product issued now could result in an uncomfortably low rate of growth when it is compared with estimates for later years that are based on much firmer data. Natural caution of this kind has to be tempered with a realisation that many estimates that are far from satisfactory are nevertheless of use for certain purposes. The Director of Statistics must be able to make the users of the data realise that new information that improves current estimates may involve revisions (perhaps rather large revisions) of estimates already in circulation for earlier years. In view of the uses that may have been made of national income aggregates or some parts of the estimates by people who do not realise how large a margin of uncertainty should be attached to them, this action can sometimes result in a flood of criticism of the Director of Statistics. This risk is probably unavoidable and there can be no justification in trying to avoid it by excessive caution.

(d) It may happen that a Department of Statistics is not striking the right balance between (i) collecting and analysing primary data and (ii) playing a part in the use and interpretation of this data for government policy. The latter often involves the drafting of papers and attending inter-departmental meetings as well as engaging in the exchange of views and critical discussions that are so important in the life of higher civil servants. Statisticians can play a useful part in this way and those with a wide outlook want to do so. On the other hand, it is time consuming and too much of it inhibits the development of primary data which, in itself, is the basis of the help that Statisticians can give in policy making. At the other end of the scale, some Statistics Departments find themselves in a position in which they do little more than collect primary data and write rather general reports. They may be questioned about the scope or reliability of their figures but they are not asked to interpret them in the full sense nor to play any part in the policy making discussions. Such a situation can be frustrating for a Statistician with a wide outlook and can lead to young Statisticians doing all they possibly can to move to work that is entirely on the policy making and administrative side. The best way of striking the balance between these two forms of activity must be a matter of judgment and one that has to be exercised continuously as a programme of work is evolved. Lack of balance in either direction is never likely to be a situation that can be corrected quickly. Some adjustments, in fact, are not possible until there are staff or posting changes that make it possible for new relationships to be worked out.

16. However well a Director of Statistics solves the problems I have selected and many others too, and however well he is supported by qualified, middle-rank and clerical staff he is bound, at times, to feel that there is so much needing, yet not receiving, attention. He should, however, not be depressed for long if his department is moving forward well and has a record of new achievements year by year. A good and well balanced statistical service cannot be created quickly.

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SUMMARY

Agenda Item:H.2. United Kingdom

ORGANIZATION OF STATISTICAL SERVICES

By W.F. SEARLE,
Chief Statistician,
Department of Technical Co-operation,
United Kingdom

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No. 191

H.2.

ORGANISATION OF STATISTICAL SERVICES

by W. F. Searle, Chief Statistician,
Department of Technical Co-operation,
United Kingdom

SUMMARY

During the last fifteen years the need for a Department of Statistics was self-evident in many larger developing countries; equally obvious was the inability of a number of very small administrations to justify a specialised statistical service. Between these two extremes were countries in which the timing of a change to a specialised statistical service represented a difficult decision. Occasionally a first step forward could be taken by setting up a Statistical Bureau as distinct from a Department of Statistics.

2. Little can be said about statistical work in very small countries or territories. Visiting experts can undertake ad hoc studies and some forms of statistics can be produced in Departments like the Customs Department. At the other extreme, the special problems arising in very large countries have not been considered.

3. The report of the International Seminar on Statistical Organisation held in Ottawa in 1952 (U.N. Statistical Papers, Series M. No.16) contains a good definition of the functions of a national statistical system but the conclusions are inevitably worded in general terms when the report deals with statistical organisation and the nature and scope of national statistical programmes. So much depends on the circumstances of each country.

4. Since the countries under consideration are all endeavouring to develop at a rapid pace their requirements are related to their need "for an understanding of the economic and social structure" which is very great indeed.

5. This situation is reflected in the place that is given to statistical services in the machinery of government, a common arrangement at the present time being for the Statistics Department to be part of the Ministry that is concerned with economic development and for it to be linked closely with the organisation that has responsibility for development planning. This arrangement may have an influence on priorities for statistical work.

6. A Statistics Department has a special role to play in the relationship between Ministers and Civil Servants in the course of which policies are framed as a balance between short-run and long-run considerations. There is something essentially democratic about Yearbooks and Digests of Statistics.

7. A Director of Statistics is usually faced with a never-ending task of making the best use of the limited means at his disposal. This is a many-sided problem; very important is the need to be in touch with current views on methods and techniques and to adopt or develop those that are simple and direct. Nothing is more important than a sound knowledge of sampling theory and practical skill in applying it.

8. It is never easy for a man who does not know a country well to start a Statistics Department but once one has been created it is a great advantage that many forms of technical assistance are available to the less developed countries.

9. Many Statisticians come into their work as "applied" mathematicians or "applied" economists. It is advisable to direct attention away from the question of all-roundness in the outlook and skill of individual Statisticians and to stress the need for a well-balanced department. If departmental training is well organised, initial differences in education and outlook begin to be less distinctive after a few years and, at the administrative level in the department, should cease to be relevant.

10. A fundamental question is "how centralised should a statistical organisation be?" Since priorities cannot be expressed properly by the allocation of whole units of Statisticians' time centralisation is essential in the earlier years (and much longer in a small country). When the number of Statisticians has expanded, there may well be much to be said for the organisation of statistical units in the larger Ministries or Departments such as those handling agriculture, labour or education. In these circumstances, however, arrangements are necessary so that Statisticians can be moved from one post to another and kept in line for promotion. There is a danger of "isolated groupings".

11. The following problems facing a Director of Statistics have been selected for discussion:-

(a) The importance of a survey organisation (usually working with households as the sampling unit) that can be kept continuously in existence although it may have to be expanded by temporary labour for certain larger surveys.

(b) How to avoid being swamped by large operations like a population census.

(c) When are capital formation or balance of payments estimates or a full set of simplified national accounts ready for circulation that is not very restricted.

(d) How to adjust the balance when a Statistics Department is spending too little (or too much) time on the use and interpretation of statistics for government policy and too much (or too little) on the collection of primary data.

12. However well a Director of Statistics solves these and other problems he is bound, at times, to feel that there is so much needing, yet not receiving, attention. A good and well-balanced statistical service cannot be created quickly.

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Agenda Item : H.1

Portugal

INPUT-OUTPUT TECHNICS IN PORTUGAL

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of Industrial Economy

Papers have been contributed to the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas as working papers for that Conference. They are published as presented by the contributors, and the contents and the views expressed are those of the contributors. (See notes overleaf.)

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" INPUT - OUTPUT TECHNIQUES IN PORTUGAL "

by
João M. Cruzeiro

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1 - The National Institute for Industrial Research and the Association of Portuguese Industries have been working in close collaboration in drawing up the first Portuguese Input-Output table with reference to the year 1959.

The present communication aims at giving a provisional description of this work with especial emphasis on the problems of method which arose and on the types of solutions which were adopted.

A brief reference will be made, at the outset, to the objectives sought, followed up with a description of the main characteristics of the Portuguese tables. Next, the problems of statistical sources and methods will be considered together with the solutions given to those problems. Finally, attention will be paid to the utilisation and development envisaged in regard to the Input-Output table in Portugal.

Objectives:

2 - Although the Leontief method and input-output analysis have been known and studied in Portugal for many years, the idea of drawing up an input-output table began to take shape in view of the exigencies of planning and, more precisely, as a critique of the methods of drawing up the Second Development Plan (1959-1964).

In fact, in Portugal as in other countries, the statistical application of input-output methods arises from the necessity of gathering the data considered indispensable for programming sectoral economic development. More concretely: the first Portuguese table aims initially at prepare the next Development Plan (covering, in principle, the period 1965-1970).

It is natural, therefore, for all the work of empirical quantification to be influenced by this particular aim of application, particularly as regards the structure of the table and the sources and methods adopted.

Brief description of the Table:

3 - The present Table refers, as already stated, to the year 1959 and to the territory of continental Portugal. As regards the other Portuguese territories, since these are geographically separated from the former, it became necessary to exclude them from the analysis, even because they should be studied in the light of the considerations of Profs. Peacock and Dosser on the priority to be given to the estimate of national income and to the preparation of sectoral accounts of the activities for which better statistical data are available. As regards the choice

of the basic year, the fundamental reason is that a district-wise Industrial Survey was carried out between the years 1957 and 1959, the main Industrial districts (1) having been studied in 1959 and the respective data published towards the end of 1960.

The characteristics of the Portuguese Input-Output table reflect, as has already been said, the purpose of applying it to the study of the projections of the Portuguese economic structure, particularly in the field of industry. Hence the special attention paid to the industrial sectors and to external trade, the transactions with the Portuguese overseas territories being studied separately.

The Table shows 40 sectors, 27 of which are related to secondary activities (mining, manufacturing and building industries). On the other hand, the primary sectors are studied with a detail surpassing that of many tables drawn up in other countries (4 sectors for crops, 1 for live-stock farming, 1 for fisheries and 1 for forest-products). However, this part of the work drew relatively little attention inasmuch as it had small bearing on the industrial sectors and on external trade.

In relation to external trade, care was taken to study important export activities under special sectors, such as wines (sector 4), canned fish (10), cotton fabrics (14), cork (17), paste and paper (18). Side by side and with a view to differentiating the imports originating from the Portuguese overseas territories, two fictitious sectors were detailed for agricultural and forest products, one of these including an important part of those products and the other including products considered as competing with those of Continental Portugal.

The following may be pointed out as the other characteristics of the Portuguese Table: it is a square Table, in which the flutuations are recorded on the basis of the producer's price and the imports figure alongside the internal production considered as a component of the total resources of each sector, excepting the produts from Overseas Portugal and, in general, the tropical products. As regards the secondary products, the solution adopted is analogous to that of the Japanese Table for 1951 although an exception has been made in some cases in which an important part of the main material is found associated, for economic reasons, with the main products of the sector (e. g. the extraction of clay , sand or Kaolin used in cement and ceramic industries).

Statistical sources and methods:

4 - Owing to the limits set down for this communication, it is not possible to go into a complete analysis of the sources and methods utilised in drawing up the Portuguese Table. It will, however, be useful to describe the more important aspects in order to enable an appreciation of the reliability of the estimates.

The first point which needs to be stressed is the importance attributed to the sources relating to the industrial sectors, which as already pointed out, were a decisive factor in the choice of the basic year for the Table.

In fact, in the years 1957 to 1959, the National Institute of Statistics (I. N.E.) carried out a survey with a view to obtaining as complete information as possible regarding the industrial structure of various districts in Continental Portugal, the most important districts having been investigated in 1959, as already stated.

This survey took a establishment as the basic unit and included various classes of I.S.I.C. (in a few cases, groups (2)) corresponding to the mining, manufacturing and building industries and even to the sectors of electricity, gas and steam. As regards the elements of survey, there are, among others which need not be mentioned here, data for each of the abovementioned classes (and groups) in respect of the value of production and of the expenditure over raw material (total

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(1) Lisbon and Oporto. Besides these, inquiries were conducted in 1959 also in two out of the three other districts of industrial importance.

(2) That is, although the results published by I.N.E. refer to the classes of I.S.I.C., groups are at times discriminated in case of important activities of the districts surveyed.

amount), electricity and fuel and lubricants.

5 - It was, however, necessary to descriminate the data relating to the "inputs", which could not be obtained in that survey, even by means of an analysis of the distribution of "outputs" (3). This problem was solved differently for each industry or production, although it was sought, in every case, to follow the model international classifications, which became rather easy owing to the fact that the regular Portuguese statistics generally follow the rubrics of those classifications.

Thus, in regard to a certain number of secondary sectors, it was possible not only to establish a comparison with the data of the industrial Survey as also to obtain the most unrelated information. This was achieved chiefly by recourse to the annual statistics of the industry concerned, for such statistics give much more detailed information both as regards production and as regards expenditure on raw materials and sources of energy.

There are, in Portugal, two regular statistics (annual publications), whence it is possible to obtain data relating to the value of production and the expenditure of the various industries. One of these publications (Statistics of Companies), of lesser interest for the elaboration of an Input-Output Table, takes the enterprise with the legal status of a company as the unit and, consequently, does not make any distinction between principal and secondary productions, besides leaving out of account the production of enterprises standing in the name of individuals. Nevertheless, it proved to be useful not only for the purpose of comparing various global data of the industrial survey (4) but especially for working out the data relating to the tertiary sectors, since it is practically the only publication in Portugal, which supplies information regarding those sectors.

The more important of the two publications is undoubtedly the "Industrial Statistics". In fact, the latter has the following characteristics of great interest for the preparation of an Input-Output Table:

a) A more detailed treatment of the secondary sectors, for it includes more than 80 industries, some of them corresponding to the I.S.I.C. subdivision of groups;

b) it takes the establishment as the basic unit, so that all the data refer to this unit;

c) above all, it gives an indication of the principal raw materials and fuels consumed in various industries (in quantities and values), information which is not available in the other statistical publication already refered to.

6 - It can thus be said that, in respect of the secondary sectors, the statistical basis was provided by the Industrial Survey and the "Industrial Statistics", the former for the production values and global data on expenditure and the yatter for the discrimination of "inputs".

Although "The Industrial Statistics" constitute a sort of annual census, given the details it supplies (5), it has the inconvenience of leaving out various important industries, as may be seen from the table given below, where the degree of coverage given by that publication and by "Statistics of Companies" in respect of the big industrial aggregates is examined in the light of the findings of the Industrial Survey.

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(3) This was, however, sought to be done by using the detailed data supplied by I.N.E.

(4) Such comparison became possible owing to the fact that both publications use strictly the rubrics of I.S.I.C. in defining industries and industrial sectors.

(5) This was useful in completing or comparing certain data on cost structure and other matters by reference to the Industrial Statistics published before 1959.

Production Values

(in % of those given by the Industrial Survey)

Industrial Sectors (according to I.S.I.C. classes)	Statistics	
	Industrial	Companies
11 to 19 Minig	64	65
20 to 22 food, beverages and tobacco	61 (1)	82
23 Textile	94	66
24 Clothing and footwear	49	48
25 and 26 Timber and furniture	55	67
27 and 28 Paper, printing, etc.	51 (2)	90
31 and 32 Chemicals and oil products	78	100
33 Mineral products, metal works	73	100
34 Metallurgical products	100	100
35 and 36 Metalo-mechanical products		60
37 Electrical material	31	76
38 Transport material	100	100
29, 30 and 39 Various manufactures	62	100
40 Building		41
11 to 39 Total for Industry	65	90

(1) This deficiency of coverage refers mainly to flour mills and panification.
(2) A gap is seen in the "Industrial Statistics" in relation to printing and publishing enterprises.

It has been found that there are industrial sectors which are insufficiently treated in the Portuguese statistical system, at least in so far as the working out of an Input-Output Table is concerned. This is the case of the metalo-mechanical and electrical industries, basic chemicals and even the sectors of clothing and footwear, timber and furniture, and printing and publishing, the production which is not included representing, in all, about one third of the total industrial production value given by the Industrial Survey.

In order to obviate these gaps, the method of determination of inputs by means of distribution of the volume of the available resources over intermediary utilizations (production + imports + final utilizations) was adopted in relation to certain sectors, such as those of clothing and footwear and of printing and publishing in which certain raw materials are great weight. And it may be stated at once that, both for the qualitative assessment of these inputs and for the distribution just mentioned, some foreign Input-Output Tables were made use of.

7 - But, in order to bridge the gaps in the regular statistical sources, resourse was chiefly had to surveys of the professional organs of the industries concerned and, in the last analysis, of the enterprises themselves such was the method adopted for all or some of the principal industries or productions. included in the metalo-mechanical, electrical, chemical and timber sectors.

This is the stage to stress the importance of the existence or of the non-existence of representative organs of an industry or sector, duly prepared to collaborate in the statistical tasks of the input-output type or other tasks making like demands. Indeed, if lack of official statistics is a serious obstacle in the construction of an Input-Output Table, the situation is considerably worsened if there is no possibility of recourse to entities of the type refered to, whether in the case of private associations or of public bodies having powers to interfere with or control one more of activity.

In respect of the abovementioned sectors and industries, the following entities (or departments) exist in Portugal:

a) in the first place, the specialized sections of the National Institute for Industrial Survey and of the Portuguese Industrial Association, which, as stated at the begining of this paper, are the entities which undertook the ellaboration of the Input-Output Table;

b) The "Grémios" (6) of the metallurgical and metallo-mechanical industries, pharmaceutical products, tailors, footwear makers, tanners, graphic industries, publishers, daily and regional press.

c) The specialized sections of the Corporation (6) of Industry;

d) And, finally, the Committee Regulating Chemical and Pharmaceutical Products, an official body charged with the task of economic coordination (7)

It should be noted, however, that the specialized sections, indicated under a) and c) above, do not have permanent functions and some of the "Grémios", either because they were formed recently or for some other reason, have not shown themselves able to offer the necessary collaboration.

8 - It was, therefore, necessary directly to consult the main enterprises in some of the industries, namely the metallo-mechanical, electrical, clothing and footwear, and timber and furniture, besides certain enterprises in various industrial sectors and in the sectors of building and public works.

It is useful to refer to two aspects of the organization of these surveys, namely the advantage of defining beforehand clearly which are the productions needing to be analysed and what is the most convenient form of discriminating the inputs. This, in any case, is a problem of previous classification. As regeards the first, it is deemed efficacious to take the I.S.I.C. classification as a basis for a detailed classification of the productions. This is found to be compatible not only with the differences in the structure of production which are inevitably to be met with in different countries but also useful from the point of view of international comparison of input-output data. Again,as regards the manner of discriminating inputs, there are many possible solutions in so far as the de tails to be sought or accepted from enterprises are concerned. In Portugal, given the non-existence of a code of commodities which may be easily consulted by the enterprises, recourse was had indistinctly and partly according to circumstances to one of the following three processes:

a) the enterprises were simply asked to give the "main" raw-materials and fuels, leaving them free to indicate the specifications and such details as they thought convenient;

b) they were asked to discriminate the inputs by sectors of origin, according to a very simple list showing the correspondence between the sectors of the Input-Output Table and the main products falling within those sectors.

c) finally, at the request of some of the enterprises which were greatly concerned about secrecy, simple cost structures, in percentages, were accepted,(8).

9 - Going on to the remaining sectors, we shall dwell on the so-called primary sectors (9). Here two the situation is highly unequal as regards the products and the typpes of data.

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(6) The "Grémios)(basic organizations grouping enterprises of the same activity) like the "Corporations" (top organizations having the function of coordinating the interests of a big sector of activity) are bodies falling within the constitutional scheme of the Portuguese Corporative System.

(7) Such a body is a public entity with powers to regulate some economic activities, especially those connected with external trade.

(8) It is good to bear in mind that the elaboration of the Input-Output Table, though partly carried out by a public body, is not patronized by the Government and does not have the power to compel the supply of information and statistical data.

(9) As regards the tertiary sectors, we only wish to stress that, for reasons indicated under 3 above, special attention was paid only to commerce and to transport, more particularly to the former.

The first point to be stressed refers to the regular statistical which consist fundamentally of the "Agricultural Statistics" (10), besides certain data on consumption given by the National Accountancy.

The "Agricultural Statistics" is an annual publication which, among other items of information, gives quantitative data on the main productions of the primary sectors and on some of their inputs. But it suffers from two important lacunae:

a) It gives scant information regarding the quantities and values of certain productions namely in the sector of horticulture and fruits (sector 2 of the Portuguese Input-Output Table), live-stock (sector5) and forestry (sector 6);

b) it gives no information whatsoever on the cost of production.

In order to solve the first of the abovementioned problems, recourse was had fundamentally to certain surveys and estimates which had been published before, relating to the years previous to that of the Input-Output Table, and the corresponding adjustments were then made in respect of each of the productions, normally in function of the variations observed until 1959 in the respective consumption in the country or in the main urban centres. It should be noted, however, that, in spite of the lacunae of the"Agricultural Statistics", it was possible to extract from it, directly, sufficient indications to estimate the value of the production of cereals, wines and oil, and even of some horticultural produts.

Nevertheless, as regards the cost of production, that publication gives information only about the seeds used in the cultivation of cereals but does not give any data of the type of "production account." To overcome this deficiency the fact was admited that the inputs of the primary sectors are almost exclusively utilized in those sectors (11), it being also relatively easy to allocate the inputs to each sector. On the other hand, when it comes to the industrial products almost all of which are to be found in the regularly statistics, it becomes possible indirectly to estimate the quantities and values of those inputs, namely the chemical fertilizers, copper sulphate and other insecticides and pest-killers as well as fodder. At the same time it is now sought to obtain from other economic coordination bodies (12), information which may enable not only to complete the data on inputs as also to compare the allocations and estimates made according to the method mentioned above.

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10) The figures for the external trade of Agricultural products appear in the General publication "Comércio Externo", which collects very detailed annual data on the quantities and values of the exports (F.O.B.) and of imports (C.I.F.).

11) With the exception of fuels and of chemical fertilizers used in the composition of mixed fertilizers. Out the quantities in this case are available in the "Industrial Statistics"

12) Vide footnote (7). These bodies cover, among others, almost all the primary sectors.

10 - In conclusion of this part of the communication, a brief reference may still be made to two points: the use made of the foreign Input-Output Tables and the correlation with National Accountancy. As regards the first point, reference has already been made to the usefulness of foreign Input-Output Tables, especially of countries with an analogous structure and degree of development, for a qualitative definition whether of the types of inputs in a sector or of the various possible intermediary utilizations of a given output. And, if it is not prudent to use internationally a particular technical coefficient, it is not less true that such structure can serve as a basis for working out certain estimates allocations, as it happened in the case of the Portuguese Input-Output Table in respect of the inputs of the agricultural sectors and even of some industrial sectors.

Finally, as regards connection with National Accountancy, we only wish to stress that the Portuguese Input-Output Table, though using some data (and the corresponding methods) taken from that accountancy (13), stands, by the very reason of the lacunae of the Portuguese statistical method and of the possibilities of analysing its international coherence, at a level of a critique of those data and methods, so that no correspondence between the two is to be expected.

Utilization and development envisaged.

11 - Given its origin and characteristics, it is to be expected, as already stated, that the Input-Output Table will be utilized, first and foremost, for studying the prospects of the economic development of Portugal, special attention being paid to industrialization and external trade. It is evident that the ideal practical sphere for such a study is the elaboration of the big lines of sectoral economic policy, which is equivalent, at the moment, to the preparation of the third development Plan (1965 - 1970). Be that as it may, even if the first Portuguese Input-Output Table does not reveal itself sufficiently satisfactory in its efficacy, it will always be worth while as an important critique of the system of economic statistics and will thus be susceptible of progress in this domain, having profound repercussions on the study of Portuguese economy.

12 - As regards the developments which may be envisaged in the field of input-output analysis in Portugal, it is thought that they are partly conditioned by utilizations, since, whether to obtain the support of the enterprises (at least for supplying data) or to secure the patronage of Government bodis, it seems indispensable that the Input-Output Table give evidence of its practical usefulness in questions of economic policy.

In any case, we believe it is legitimate to foresee that, as it happened in other countries, after the elaboration of the first Input-Output Table with all its shortcomings, limitations and restricted aims, other Table or Tables will be worked out with ampher sectoral perspectives and not only with better statistical foundations but with a sufficiency of technical staff, both in quantity and quality (14), so as to carry out efficaciously and speedily a task of such undeniable practical interest in the domain of economic analysis and policy.

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(13) In respect of some primary and tertiary sectors. Regarding data on consumption (public and private) and investment, it was necessary, as a rule, to refer to primary sources or to estimates of a residual type.

(14) In fact, we cannot but stress that, in the case of the Portuguese Input Output Table, time was lost owing to the insufficient staff, which at no time exceeded three persons and, even so, none of them working full time.

SECTORS	I.S.I.C. Standard International Classification of activities (Classes and Groups)
1-Cereals 2-Horticultural products and fruits 3-Wines 4-Oil and Olives 5-Animal products 6-Forest products	01
6-to-1-Agr.-Forest products-Overseas	02
6-to-2-Agr.-Forest products-Foreign	
7-Fisheries	04,Ex 381
8-Mining industries	110,121,122,130,140,190
9-Food	201-203,206-209
10-Preserved fish	204
11-Flour Mills	205
12-Beverages	211-214
13-Woollen textiles	Ex. 231,Ex. 239
14-Cotton and other fibre textiles	231 (except wool and mixed),233, 239 (except tapestry),244
15-Clothing and footwear	232,241 to 243
16-Timber and furniture	250 (except cork),260
17-Cork	Ex 250
18-Paste and paper	271
19-Inorganic chemical products	311 (except explosives and fireworks)
20-Other chemical products	Ex 311,312,319
21-Oiland coal derivatives	321-329
22-Ceramics, glass and cem. products	331-333,339
23-Cement	334
24-Steel	341 (except the first transformation and smelting)
25-Metallurgy of non-ferrous metals	342 (Id.)
26-Pre-transformation of metals	Ex 341, Ex342
27-Metal const. and equipment.	360,Ex370,382
28-Other metal products	350
29-Electrical material	370 (except heavy elect. mat.)
30-Naval construction	381 (except wooden structures)
31-Motorcars	383 (except motocycles and similar)
32-Diverse transport material	Ex 383,385-389
33-Various manufactures	220,272,280,291-292,300,391-399
34-Building and public works	400
35-Electricity	511-513,521-522
36-Commerce	611,612
37-Transport	71
38-Services	364,620,630,(some of those belonging to classes 82,83,84)
39-Scrap	——
40-Undistributed	——

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SUMMARY

Agenda Item: H.1

Portugal

INPUT-OUTPUT TECHNICS IN PORTUGAL

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INPUT-OUTPUT TECHNICS IN PORTUGAL

by

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Assistant, National Institute for Industrial Research, section for the study of Industrial Economy.

Summary:

The present communication aims to emphasize particularly the type of problems that are met with in the elaboration of an Input-Output frame though also refer to some aspects dealing with its utilization.

The text, based on the Portuguese experience in the elaboration of the Input-Output Table for Inter-Industrial Relations in 1959, attempts to give a description, though provisional, of these matters, with a special stress on the problems of sources and methods that arose and on the different types of solu - tions adopted.

It begins by a quick reference to objects that were at the source of the work, followed by a description of the main characteristics of the Portuguese Table. Then, follows namely the sources and statistical methods and the solutions given to various problems.

Finally, the utilization and the developments envisaged for inter-industrial analysis in Portugal are briefly considered.